

Appendix A
Statement of Work
“Updating *Studying Wind Energy/Bird Interactions:*
***A Guidance Document*”**
December 10, 2007

1.0 INTRODUCTION

A number of site-specific parameters need to be well understood before a wind project is constructed. These parameters include the wind resource, transmission availability, land lease arrangements, power purchase agreements, and potential wildlife impacts, among others. Each of these parameters is a key input for project decision makers, either internal (e.g. developer) or external (e.g. permitting agencies, financial institutions, etc).

During the early years of wind project development, little was known about potential impacts from wind turbines on birds. Further, approaches to assessing potential risks were not well documented. Stakeholders concerned about this issue sought a reference document to provide an overview of the metrics and methods that could provide a common basis for assessing potential impacts, with a particular focus on diurnal species at land-based wind facilities.

2.0 BACKGROUND

In 1999, *Studying Wind Energy/Bird Interactions: A Guidance Document - Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites* (see http://www.nationalwind.org/publications/wildlife/avian99/Avian_booklet.pdf) was prepared for the Avian Subcommittee of the National Wind Coordinating Committee (NWCC), now called the Wildlife Workgroup (WL WG) of the National Wind Coordinating Collaborative (NWCC).

The purpose of the 1999 document was four-fold as follow:

- 1) Provide a thorough reference document for use by all stakeholders that would, if followed, result in a body of information adequate to reliably assist in turbine pre-siting assessment.
- 2) Provide clear methods, metrics and definitions for use in the study of wind energy/bird interactions.
- 3) Promote efficient, cost-effective study designs, methods and metrics that will produce comparable data, reducing the need for overlapping studies.
- 4) Provide study designs and methods for collection of information useful in reducing risk to birds in existing and future wind plants.

The 1999 document focuses on avian activity and the use of wind farm habitats by birds. It presents tools and scientific protocols for efficient and accurate characterization of use

of proposed/operational wind farm development sites by birds. The document was intended to be exhaustive in nature, reviewing all the latest “tools,” scientific technologies and accepted research protocols, and published literature pertinent to studying birds at land-based wind facilities nationwide.

3.0 PROJECT OBJECTIVES

The two objectives of this effort are as follows:

- Develop a framework document
- Update the Guidance document.

These documents, along with the recently published guidance document focused on nocturnal species (see reference below) will complete a set of state-of-the-art companion documents designed to assist in the assessment of wildlife impacts from wind turbines.

The **first objective**, developing a framework document that is specific to wildlife and wind turbine interactions, is intended to provide guidance on how to ask the right questions that need to be addressed with respect to potential direct and indirect (habitat) wildlife impacts (both positive and negative) at a specific wind project development site and how to choose which methods to use to address those questions. The Offeror shall propose an approach, which may include the adaptation of an existing framework currently in use in another industry or field that could be applied to this situation (e.g. ASTM standards), as discussed below in section 4.0 Scope of Work and Tasks.

The **second objective** is to update *Studying Wind Energy/Bird Interactions: A Guidance Document* with the best available information. The Offeror shall propose a strategy to update the 1999 document with current information, including a proposed approach for evaluating material for inclusion in a revised document, as discussed below in section 4.0 Scope of Work and Tasks.

To the extent feasible, the Subcontractor shall evaluate the ability of the techniques proposed in the original document to successfully predict probability of impact or habitat disturbance to birds and other wildlife, as discussed below in section 4.0 Scope of Work and Tasks.

The updated document shall also contain information about the value, cost, and practical issues associated with known techniques and must include information about the new techniques that have proven effective predictors of impact. In addition, the updated document shall provide information about promising new technologies and associated limitations or qualifications of those technologies, including their respective costs.

Suggestions for additions or alterations to the current document are encouraged. A sampling of new topics that should be contained in the updated document include, for example:

- fatal flaw analysis;
- pre-construction assessments;

- extensive discussion of habitat issues;
- search intervals;
- search distance from turbines;
- use of canines for carcass searches;
- use of GIS tools; and,
- use of vegetation control for carcass searches.

In addition, the Offeror shall lay out an approach to addressing the issue of how to identify bird and bat migratory corridors, and their corresponding migratory periods, and how this information may be used when assessing potential site specific impacts.

Offerors should be aware that in 2006, the NWCC WL WG contracted for a companion document to be developed entitled *Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document*. This document addresses: 1) potential impacts on resident and migratory populations; 2) fatality rates on resident and migratory populations; 3) the causes of bird and bat fatalities; and 4) methods for reducing risks to bird and bat populations and their habitats. The manuscript was published by the Journal of Wildlife Management in November 2007: http://www.nationalwind.org/pdf/Nocturnal_MM_Final-JWM.pdf. The updated document required under this effort will NOT need to address nocturnal species; it will be a companion to *Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document*.

Consistent with the consensus-based approach used by the NWCC WL WG that resulted in the publication of the 1999 document, the National Renewable Energy Laboratory (NREL) will be looking for, among other things, a qualified individual or team that offers the best plan to meet the project objectives with input from all stakeholder groups represented on the NWCC WL WG.

4.0 SCOPE OF WORK AND TASKS

The following tasks shall be completed:

Task 1 - Conduct review of reference sources

The Subcontractor shall obtain and evaluate material for inclusion in both the Framework and the updated Guidance Document. A reference list for each document shall be provided to the review panel. Comments and suggestions for additional references for each document will be returned to the Subcontractor by NREL within 30 days of receipt of the reference list.

Task 2 - Develop Draft Framework and Guidance Document

The Subcontractor shall develop the Draft Framework and revise and update the Guidance Document, incorporating material gathered under Task 1. Comments from the review panel on the Draft Framework and Guidance Document will be returned to the Subcontractor by NREL within 45 days of receipt of the drafts.

Task 3 - Revise Draft Framework and Guidance Document

The Subcontractor shall revise the Draft Framework and Guidance Document to incorporate the comments and suggestions received from the review panel, including additional suggested references. A Revised Draft Framework and Guidance Document shall be submitted by NREL within 30 days of receipt of comments on the drafts from the review panel. Comments from the review panel will be returned to the Subcontractor within 45 days of receipt of the revised drafts.

Task 4 - Final Framework and Guidance Document

The Subcontractor shall finalize the Framework and Guidance Document based on comments received from the review panel on the revised drafts.

5.0 DOCUMENT REVIEW PROCESS

The NWCC WL WG will provide input to NREL on the critical review, comments, and recommendations for adoption of the final document. Since the NWCC WL WG operates on a consensus basis, the document review process may be time consuming.

The Subcontractor shall submit deliverables to NREL for review and comment by the NWCC WL WG and other selected reviewers. At least one, and potentially as many as three, additional reviews will likely be required to finalize the document in preparation for publication.

Subcontractors will not be responsible for final layout, design or printing of the document. These tasks will be taken care of by NREL.

6.0 DELIVERABLES

The Subcontractor shall provide the following deliverables; written documents shall be provided in electronic format.

Task	Deliverable/Milestone	Due Date
Task 1a	Reference List for Framework	1 month after award
Task 1b	Reference List for Guidance Document	1 month after award
Task 2	Develop Draft Framework Guidance Document	4 months after award
Task 3	Revise Draft Framework and Guidance Document	6.5 months after award
Task 4	Final Framework and Guidance Document	9 months after award

Electronic Reporting Requirements for Subcontract Report Deliverables:

As set forth in Department of Energy Order 241.1A, NREL is required to submit in an electronic format all scientific and technical information, including subcontract report deliverables intended for public distribution, to the DOE Office of Scientific and Technical Information (OSTI). In addition, it is NREL's intention to post subcontract report deliverables containing publicly

available information (e.g. non-confidential, non-protected, non-proprietary information) for distribution on the NREL Intranet or the Internet.

The Subcontractor shall provide the final approved version of report deliverables intended for public distribution as specified in the deliverables schedule of this Statement of Work in accordance with the following electronic reporting requirements:

a. The Subcontractor shall submit all report deliverables intended for public distribution (including status, annual, or final reports) as electronic files, preferably with all graphics and images embedded within the document. The electronic files shall be submitted along with an accompanying hard (printed) copy(ies) of the report. Limited exceptions allowing some graphics and images to be submitted as hard copies only may be granted on a case-by-case basis. The exceptions process for graphics and images is described in Paragraph E below. It shall be made clear in the deliverable transmittal letter that certain graphics and images are supplied in hard copy only.

b. All final approved version submissions shall be delivered to NREL on PC or MAC-formatted media (3.5 inch disks, Zip and Jaz cartridges, or CD-ROM). Files of 1 Mb or less can be sent via e-mail to the 1) NREL technical monitor, 2) the NREL Subcontract Administrator or Associate (as specified in the Statement of Work).

c. The preferred format is a single electronic file that includes all of the text, figures, illustrations, and high-resolution digital photographs (or photographs should be scanned and incorporated in the text). Acceptable file formats are:

Microsoft Word (v.6.0 or newer for PC or MAC)
WordPerfect (v.6.1 or newer for PC)
Microsoft PowerPoint
Microsoft Excel

d. If it is not possible to include all of the graphics and images (figures, illustrations, and photographs) in the same file as the text, NREL will accept the text in one of the above formats and the graphics and images as separate electronic graphic or image files*. The native files for any page layout formats submitted shall be supplied. The following software is supported on both Mac and PC platforms:

QuarkXPress (.qxd)	Pagemaker (.pm)
Photoshop (.psd)	Illustrator (.ai)
Freehand (.fh)	Corel Draw (.cdr)
Framemaker (.fm)	Microsoft Publisher(.pub)

*The acceptable graphic or image file formats are: .eps, .tif, .gif, .jpg, .wpg, .wmf, .pct, .png, .bmp, .psd, .ai, .fh, .cdr. The preferred resolution for graphics or images is 150 to 300 dpi. Include all fonts that were used in creating the file.

e. In the rare case that the graphics or images cannot be supplied electronically, either incorporated within the text or as a separate electronic file, original hard copies will be accepted. The Subcontractor shall obtain prior approval

from the Subcontract Administrator before submitting graphics or images in hard copies. It shall be made clear in the deliverable transmittal letter that certain graphics and images are supplied in hard copy only.

- f. For all calculations in support of subcontract reports that are conducted in ASPEN+, an electronic copy of INPUT, REPORT and BACKUP (if Model Manager is used) must be submitted with all reports. Additionally, if costing or sizing calculations are conducted in a spreadsheet [no process calculations (heat and material balances) in spreadsheet format are permitted], a copy of the fully documented MS Excel file shall be supplied. Note that vendor quotes and other non-original material can be supplied in hard copy.
- g. A fully executed release shall be supplied to NREL with all photographs, regardless of whether such photographs are delivered to NREL electronically or in hard copy. Such release shall certify that the National Renewable Energy Laboratory and the United States Government is granted a non-exclusive, paid-up, irrevocable, worldwide license to publish such photographs in any medium or reproduce such photographs or allow others to do so for United States Government purposes.
- h. The Subcontractor may contact NREL Publication Services at (303) 275-3644 with questions regarding technical guidance concerning the submission of subcontract report deliverables as electronic files or exceptions to electronic files for graphics and images.

Deliverable Addresses - The Subcontractor shall clearly label all deliverables with the subcontractor name, NREL subcontract number, NREL Technical Monitor name, date, and the deliverable description (e.g., First Monthly Report, Draft Final Report). Deliverables shall be sent to the following addresses:

NREL Technical Monitor, *, MS 3811
1617 Cole Blvd.
Golden, CO 80401

*

- One (1) master electronic version
- One (1) master printed copy, including graphics

NREL Subcontract Administrator, Kim Tangler, MS 3811
1617 Cole Blvd.
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- One (1) master electronic version;

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National Renewable Energy Laboratory
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- One (1) master electronic version;
- One (1) master printed copy, including graphics